Renewables are All Carbon Neutral, Right?

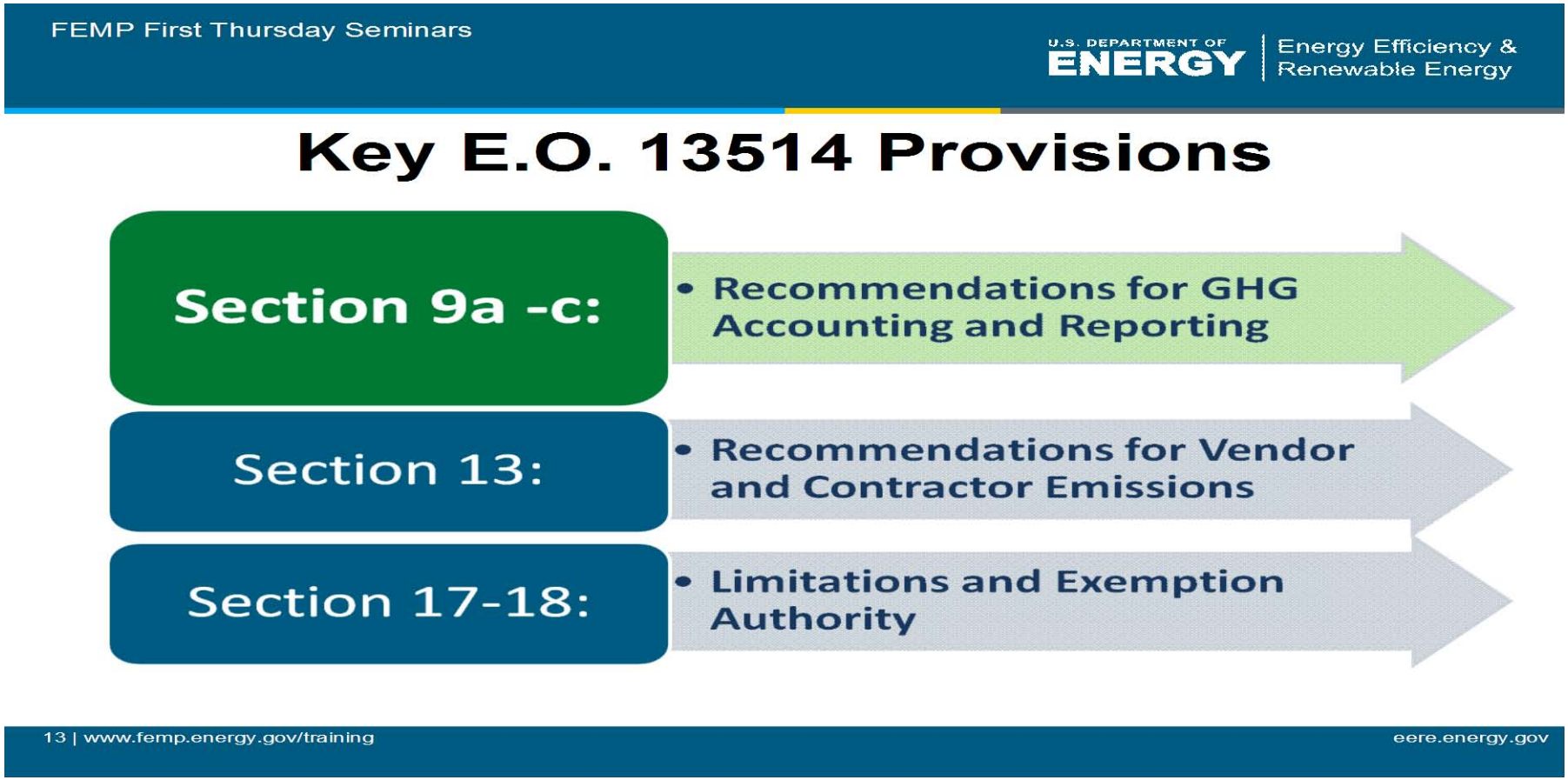
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Federal GHG Reporting

Jeremey Alcorn
LMI, supporting NREL & FEMP
October 28th, 2010

Agenda

- Sec. 9 GHG Reporting
- Biogenic CO_2 sources are a little “different”
- Biofuel Combustion Example
- Biomass, Biogas, and Biofuel Reporting
- RECs and T&D Losses
- “Crash Course” on the FEMP GHG Reporting Portal


FEMP First Thursday Seminars
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy
Key E.O. 13514 Provisions
Section 9a -c:
• Recommendations for GHG Accounting and Reporting
Section 13:
• Recommendations for Vendor and Contractor Emissions
Section 17-18:
• Limitations and Exemption Authority
13 | www.femp.energy.gov/training
eere.energy.gov

Section 9 Guidance Recommendations

FEMP submitted Section 9 recommendations to CEQ and OMB.

Both documents were released by CEQ and OMB on October 6, 2010.

Federal Greenhouse Gas Accounting and Reporting Materials Include:

Section 9 Guidance
(Contains current policy directives on GHG Inventory and Reporting Process)

- ~50 pages
- revise as necessary; likely revision in FY11

Section 9 Technical Support Document
(Contains detailed calculation methodologies and emission factors)

- ~150 pages
- update by Sep. 30 annually, as necessary

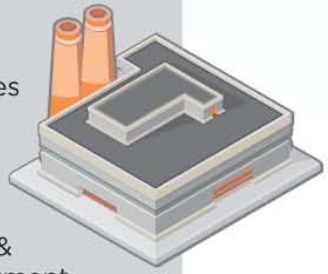
Both documents can be found at
http://www.whitehouse.gov/administration/eop/ceq/sustainability/fed-ghg

Common Sources of Federal Greenhouse Gas Emissions

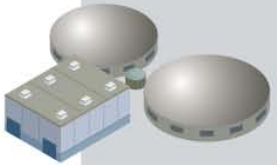
1

Vehicles and Equipment

Stationary Sources



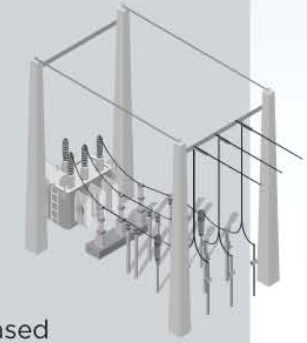
On-site Landfills & Wastewater Treatment



Fugitive Emissions

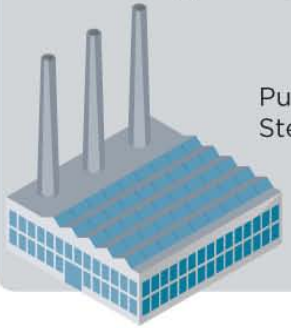
2

Purchased Electricity



Purchased Heating/Cooling

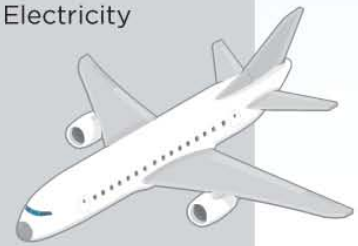
Purchased Steam



3

Transmission and Distribution Losses from Purchased Electricity

Business Travel



Employee Commuting

Contracted Solid Waste Disposal

Contracted Wastewater Treatment

SCOPE 1:

Greenhouse gas emissions from sources that are owned or controlled by a Federal agency.

SCOPE 2:

Greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency.

SCOPE 3:

Greenhouse gas emissions from sources not owned or directly controlled by a Federal agency but related to agency activities.

Biogenic CO_2 is just a little "different"

- Renewable biomass, biofuel, and biogas combustion generate biogenic CO_2 emissions accounted for separately
- But, the N_2O or CH_4 emissions from same biomass, biofuel, and biogas sources are considered anthropogenic (or human generated) and are included in Scope 1 & 2 inventories, as appropriate
- Need to fully but separately account for biogenic emissions for each emission category
- Let's work through a biogenic calculation example…

Biofuel Combustion Example

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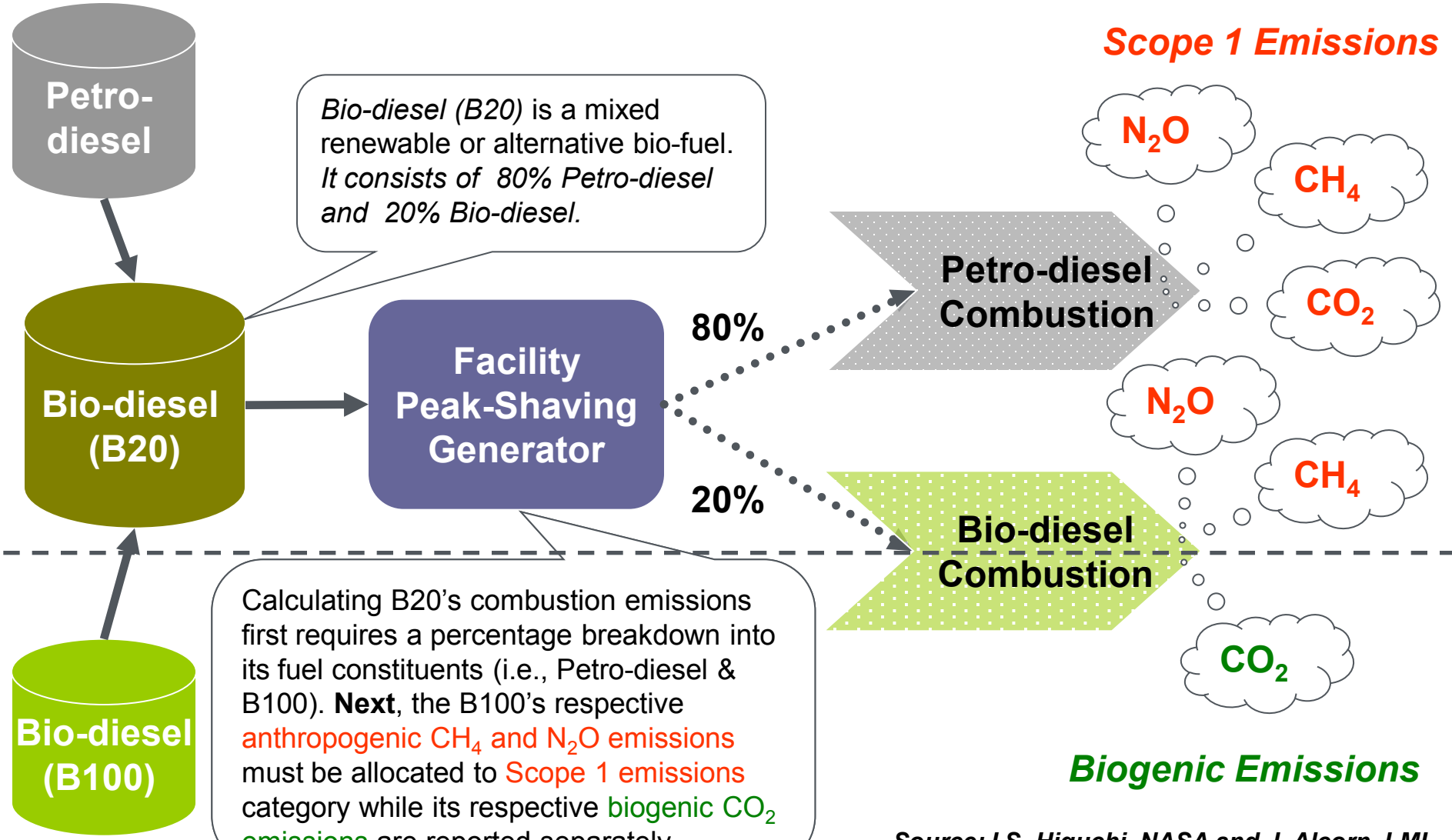

Source: I.S. Higuchi, NASA and J. Alcorn, LMI

Biomass, Biogas, and Biofuel Reporting

- Biomass
  - Report the total quantities fuel / energy consumed in the renewable energy (RE) module in tab 2.2
  - MSW should only include the renewable portion in RE tab 2.2 but report non-renewable under tab 3.2
- Biogas
  - Report the total quantities fuel / energy consumed in the renewable energy module in tab 2.2
- Biofuel
  - Report KGALs consumed under the vehicles and equipment (non-FAST) in tab 3.3
  - Report GGEs consumed as reporting from FAST in tab 3.4

RECs and T&D Losses

- RECs represent 1MWh of renewable electricity
- Bundled vs. Unbundled
  - "Environmental attributes" can be separated from the electricity itself
  - "green power" vs. standalone RECs
- Used to offset scope 2 emissions
  - GHG Reporting Portal does so automatically
- GHG calculated relative to where the electricity was generated
  - Reporters must know location of REC generation
  - Use non-baseload Emission Factors
- RECs do not include or offset T&D losses

FEMP Energy-GHG Reporting Portal

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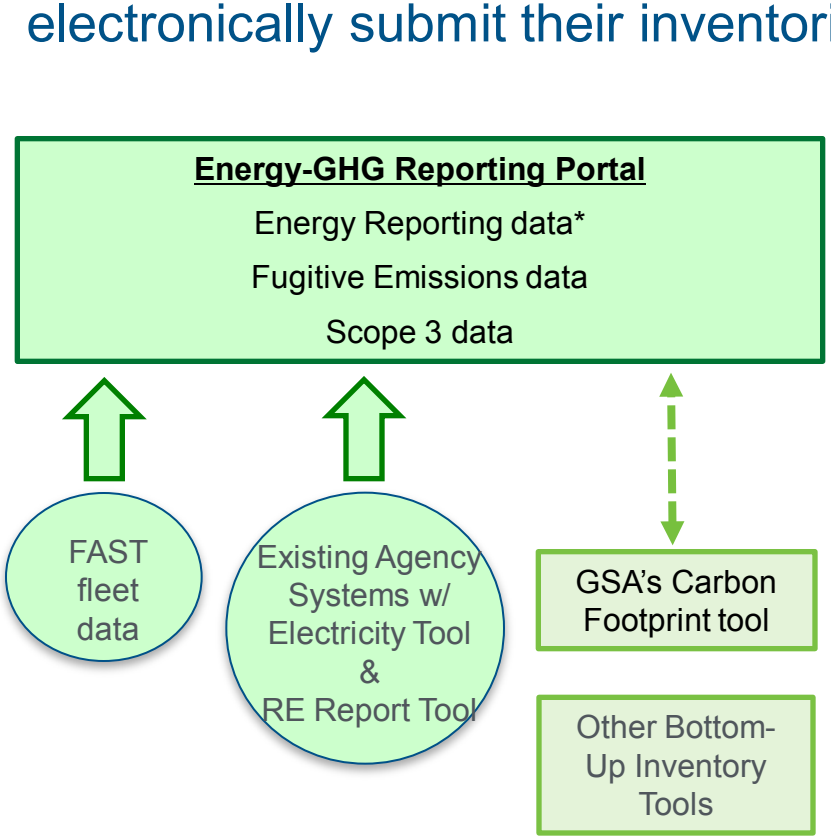
FEMP also developed a series of workbooks that will allow agencies to electronically submit their inventories.



GHG Inventory by:

Scope 1
- Stationary combustion
- Fleet vehicles
- Process emissions
- Fugitive emissions
- Biogenic CO_2 emissions (not part of reduction goal)

Scope 2
- Purchased electricity
- Purchased steam
- Purchased hot water
- Purchased chilled water
- RECs

Scope 3
- Business air/ground travel
- T&D losses from electricity
- Contracted Solid Waste
- Contracted Wastewater
- Employee Commuting

**Need to know electricity by eGrid region for scope 2 emissions*

Salient features of the Portal:

•GHG Reporting will be streamlined with existing FEMP Annual Energy Reporting.

•Portal will include calculation functionality that will work with minimum required data entered by agencies. However, agencies are responsible for "rolling up" activity level data to HQ.

The Reporting Workbooks can be found at on the FEMP website at http://www.fedcenter.gov/programs/greenhouse/inventoryreporting/index.cfm?

GHG and Sustainability Data Report Version 1.2

- For the purpose of measuring progress E.O.13514 goals, provides electronic reporting capability for the Federal agency compiled:
  - Comprehensive GHG inventory for fiscal year 2010
  - Base-year 2008 GHG inventory
- Collects agency-aggregated (top-tier Department/agency) data necessary for calculating scope 1, 2, and 3 GHG emissions
  - Commonly-used, native units of energy consumption and fugitive emissions
  - Activity data for estimating scope 3 indirect emissions
- Aligns with the Guidance/TSD and transparently incorporates methodologies, heat rate and GWP conversion factors
- Provides summation of calculated emissions as well as performance results for other sustainability goals (energy/water reduction, renewables use)

Main Components of GHG and Sustainability Data Report

- Purchased Electricity Sub-Regional Reporting Tool (Zip code based)
  - If needed or agency can directly input MWH into regions
- Renewable Energy Reporting
  - Generated and purchased renewables
  - Calculates offsets; scope 1 CH_4, N_2O, and biogenic CO_2 from biomass
- Energy/Fugitive Emissions/Activity Data for Scope 3 Estimates
  - Scope 1 Stationary fuel combustion
  - Scope 1 Mobile fuel combustion (FAST and non-fleet)
    - GHGs subject to goals vs. excluded (tactical, law enforcement, etc.)
  - Scope 1 Fugitive emissions
  - Scope 2 purchased electricity (linked to zip code tool)
  - Scope 2 purchased steam, chilled water
  - Scope 3 categories
- Non-GHG related sustainability elements workbook
  - Water consumption
  - Metering progress
  - Funding/project investment totals
  - Efficiency standards compliance for new buildings

GHG and Sustainability Data Report: Workbook Organization

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	Electricity	
1.1	Electricity Instructions	Guidance
1.2	Energy-Goal GHG-Target	Data Input
1.3	Energy-Excluded GHG-Target	Data Input
1.4	Energy-Goal GHG-NonTarget	Data Input
1.5	Energy-Excluded GHG-NonTarget	Data Input
1.6	Elec. Summary eGRID Direct Entry (no link to Zip Tool)	Data Input
1.7	Elec. Summary (Zip Tool)	Data Input
1.8	Elec. Combined Summary (Direct Entry & Zip Tool)	Reporting
	Renewable Energy	
2.1	Renewable Energy Instructions	Guidance
2.2	Renewable Energy Data	Data Input
2.3	Renewable Energy Emissions and Summary	Reporting
	Inputs/Calcs for scopes 1, 2 and 3	
3.1	Direct Fuel Use and GHGs Instructions	Guidance
3.2	Scope 1: Goal Subject and Excluded Buildings Energy	Data Input
3.3	Scope 1: Vehicles and Equipment Energy	Data Input
3.4	Scope 1: FAST Mobile (Vehicle Fleet) Energy	Data Input
3.5	Scope 1: Mixed Regrigerants	Data Input
3.6	Scope 1: Fugitive F-gases	Data Input
3.7	Scope 1: Wastewater Treatment Plant	Data Input
3.8	Scope 1: Fugitive Landfill Gases	Data Input
3.9	Scope 1: Process Emissions	Data Input
3.10	Scope 2: Steam and Hot Water	Data Input
3.11	Scope 2: Chilled Water	Data Input
3.12	Scope 2: Combined Heat and Power (CHP)	Data Input
3.13	Scope 3: Transmission and Distribution Losses	Data Input
3.14	Scope 3: Air Business Travel	Data Input
3.15	Scope 3: Ground Business Travel	Data Input
3.16	Scope 3: Commuter Travel	Data Input
3.17	Scope 3: Contracted Wastewater Treatment	Data Input
3.18	Scope 3: Contracted Waste Disposal	Data Input
	Other Reporting	
4.1	Other Reporting Instructions	Guidance
4.2	New Building Design	Data Input
4.3	Source Energy Savings Credit	Data Input
4.4	FY2010 Data Report (Water, Square Footage, Project Financing and Training)	Data Input
4.5	Performance Summary	Reporting
4.6	GHG Results Summary	Reference
	Appendices	
A.	Emissions factors by zip code data	Reference
B.	Foreign country emissions data	Reference
C.	Fuel specific emissions factors	Reference
D.	Emissions factor key	Reference
E.	Global Warming Potential Key	Reference
F.	GGE Conversion	Reference
G.	Energy Upload Sheet	Reporting
H.	GHG Upload Sheet	Reporting

Purchased Electricity Sub-Regional Reporting Tool

- Assists agencies with grouping electricity data under eGRID sub-regions for emission calculation purposes
  - For reporting of grid-provided, non-renewable electricity
  - Electricity use from renewable sources and REC purchases will be reported separately
- Tool will take electricity and associated zip code data and use embedded eGRID emission factors to calculate GHG emissions
- Assist agencies in developing their GHG inventories and in meeting their reporting requirements
  - FY 2008 base year inventory
  - FY 2010 comprehensive inventory
- Agencies can skip the use of this tool if they already have capability to collect MWH by eGRID region.

Sub-Regional Reporting for Electricity

(reflects Version 1.2 updates)

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Sub-Region	Abbreviation	Electricity (MWh)				
		Goal Subject	Excluded	Goal Subject	Excluded	Total
		GHG Target	GHG Target	GHG Non-Target	GHG Non-Target	
ASCC Alaska Grid	AKGD	488,264.7	66,642.1	0.0	0.0	554,906.8
ASCC Miscellaneous	AKMS	317,372.0	43,317.4	0.0	0.0	360,689.4
ERCOT All	ERCT	3,182,962.1	434,435.1	0.0	0.0	3,617,397.3
FRCC All	FRCC	1,464,794.0	199,926.4	0.0	0.0	1,664,720.4
HICC Miscellaneous	HIMS	463,851.4	63,310.0	0.0	0.0	527,161.5
HICC Oahu	HIOA	1,105,842.6	150,933.9	0.0	0.0	1,256,776.5
MRO East	MROE	1,711,483.9	233,596.5	0.0	0.0	1,945,080.4
MRO West	MROW	1,397,238.1	190,705.8	0.0	0.0	1,587,943.9
NPCC Long Island	NYLI	244,132.3	33,321.1	0.0	0.0	277,453.4
NPCC New England	NEWE	1,376,147.4	187,827.2	0.0	0.0	1,563,974.6
NPCC NYC/Westchester	NYCW	43,943.8	5,997.8	0.0	0.0	49,941.6
NPCC Upstate NY	NYUP	1,464,794.0	199,926.4	0.0	0.0	1,664,720.4
RFC East	RFCE	4,106,306.0	560,460.2	0.0	0.0	4,666,766.2
RFC Michigan	RFCM	1,464,794.0	199,926.4	0.0	0.0	1,664,720.4
RFC West	RFCW	2,695,221.0	367,864.5	0.0	0.0	3,063,085.5
SERC Midwest	SRMW	976,529.4	133,284.2	0.0	0.0	1,109,813.6
SERC Mississippi Valley	SRMV	2,441,323.4	333,210.6	0.0	0.0	2,774,534.0
SERC South	SRSO	1,220,661.7	166,605.3	0.0	0.0	1,387,267.0
SERC Tennessee Valley	SRTV	1,220,661.7	166,605.3	0.0	0.0	1,387,267.0
SERC Virginia/Carolina	SRVC	5,561,334.7	759,053.7	0.0	0.0	6,320,388.4
SPP North	SPNO	1,464,794.0	199,926.4	0.0	0.0	1,664,720.4
SPP South	SPSO	2,123,951.4	289,893.2	0.0	0.0	2,413,844.6
WECC California	CAMX	5,908,344.4	806,416.3	0.0	0.0	6,714,760.6
WECC Northwest	NWPP	2,109,303.4	287,893.9	0.0	0.0	2,397,197.4
WECC Rockies	RMPA	1,464,794.0	199,926.4	0.0	0.0	1,664,720.4
WECC Southwest	AZNM	2,808,747.1	383,359.4	0.0	0.0	3,192,106.4
U.S. Territories	U.S. Territories	0.0	0.0	0.0	0.0	0.0
Not Specified	N/A	0.0	0.0	0.0	0.0	0.0
Domestic Subtotal	N/A	48,827,592.8	6,664,365.2	0.0	0.0	55,491,957.9
International Subtotal	N/A	0.0	0.0	0.0	0.0	
Total	N/A	48,827,592.8	6,664,365.2	0.0	0.0	55,491,957.9

- ***ENERGY*** Goal Subject/ Excluded
- ***GHG*** Target/Non-Target
- Use Direct Entry Sheet if electricity use is already apportioned by eGRID sub-region
- Use Zip code tool if reporting non-domestic electricity use
- Can be used in combination (Direct Entry sheet for U.S. domestic only and Zip code tool sheet for foreign electricity use only)
- Version update will enhance usability; allow combined entry of domestic and international use on one category sheet

Scope 1 Stationary Combustion : EISA Goal Subject/Excluded Facility Energy

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Scope 1 Stationary Combustion Emissions: EISA 2007 Goal Subject and Excluded Building Energy Consumption

Section 9, Technical Support Document, Appendix A, Sections 1 & 2

FEMP EISA 2007 Goal Subject Buildings Fuel Consumption Default Methodology

Energy / Material / Process Type	Category	Fuel / Material	Annual Consumption GHG Target Subject	Annual Consumption GHG Target Excluded	Annual Consumption International *(If not Included under Target Subject)*	Total Annual Consumption	Unit of Measure	Cost (Thou. $)	Unit Cost	Unit of Measure
Coal	Goal Subject	Coal - Anthracite	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Coal	Goal Subject	Coal - Bituminous	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Coal	Goal Subject	Coal - Subbituminous	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Coal	Goal Subject	Coal - Lignite	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Coal	Goal Subject	Coal - Coke	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Coal	Goal Subject	Coal - Mixed (Commercial sector)	726,851.1	0.0	0.0	726,851.1	Short Tons	$78,836.2	$108.46	$/Short Tons
Coal	Goal Subject	Coal - Mixed (Industrial coking)	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Coal	Goal Subject	Coal - Mixed (Industrial sector)	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Coal	Goal Subject	Coal - Mixed (Electric Power sector)	0.0	0.0	0.0	0.0	Short Tons	$0.0		$/Short Tons
Fuel Oil	Goal Subject	Distillate Fuel Oil No. 2	177,102.3	0.0	0.0	177,102.3	Thou. Gallon	$384,737.3	$2.17	$/Gallon
Fuel Oil	Goal Subject	Distillate Fuel Oil No. 1	0.0	0.0	0.0	0.0	Thou. Gallon	$0.0		$/Gallon
Fuel Oil	Goal Subject	Distillate Fuel Oil No. 4	0.0	0.0	0.0	0.0	Thou. Gallon	$0.0		$/Gallon
Fuel Oil	Goal Subject	Residual Fuel Oil No. 5	0.0	0.0	0.0	0.0	Thou. Gallon	$0.0		$/Gallon
Fuel Oil	Goal Subject	Residual Fuel Oil No. 6	0.0	0.0	0.0	0.0	Thou. Gallon	$0.0		$/Gallon
LPG	Goal Subject	Liquefied petroleum gases (LPG)	30,000.0	0.0	0.0	30,000.0	Thou. Gallon	$53,526.2	$1.78	$/Gallon
Natural Gas	Goal Subject	Natural Gas	117,598,201.2	0.0	0.0	117,598,201.2	Thou. SCF	$1,035,780.7	$8.81	$/ Thou. SCF
Other	Goal Subject	Propane	1,518.9	0.0	0.0	1,518.9	Thou. Gallon	$3,000.0	$1.98	$/Gallon
Other	Goal Subject	[Select Fuel]	0.0	0.0	0.0	0.0	[Enter UOM]	$0.0		$/Unit
Other	Goal Subject	[Select Fuel]	0.0	0.0	0.0	0.0	[Enter UOM]	$0.0		$/Unit

- Separate Table for EISA Energy Goal Excluded Facilities (below this excerpt)
- Conversions to Btu, calculation of CO_2, CH_4, N_2O emissions, conversion to CO2e using GWP (to the right of this excerpt)
- Accommodates Continuous Emission Monitoring Systems, if available (below this excerpt and Excluded Facilities table)

Scope 1 Mobile Emissions: Vehicles and Equipment (not captured by FAST)

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Scope 1 Mobile Emissions: Vehicles and Equipment (not captured by FAST)

Section 9, Technical Support Document, Appendix A, Sections 1, 2, 3, & 4

FEMP Vehicles and Equipment Default Methodology

Fuel Group	Fuel	Annual Consumption GHG Target Subject	Annual Consumption GHG Target Excluded	Annual Consumption International *(Not Included under Target Subject)*	Total Annual Consumption	Unit of Measure	Total Energy Consumed	Unit of Measure	Cost	Unit of Measure	Unit Cost	Unit of Measure
Petroleum	Diesel	17,808.1	282,124.2	0.0	299,932.3	Thousand Gallons	41,390,656.6	MMBtu	$634,297.1	Thou. $	$2.11	$/Gallon
Petroleum	Gasoline	6,162.0	83,242.8	0.0	89,404.8	Thousand Gallons	11,175,604.2	MMBtu	$176,094.2	Thou. $	$1.97	$/Gallon
Petroleum	LPG/Propane	501.1	4,308.3	0.0	4,809.4	Thousand Gallons	442,467.2	MMBtu	$2,008.1	Thou. $	$0.42	$/Gallon
Petroleum	Aviation Gas	956.9	1,137.5	0.0	2,094.4	Thousand Gallons	251,328.0	MMBtu	$9,439.8	Thou. $	$4.51	$/Gallon
Petroleum	Jet Fuel	38,852.9	3,850,647.9	0.0	3,889,500.8	Thousand Gallons	525,082,609.7	MMBtu	$7,414,886.0	Thou. $	$1.91	$/Gallon
Petroleum	Navy Special	32,680.6	631,020.3	0.0	663,700.9	Thousand Gallons	92,918,129.4	MMBtu	$1,209,754.0	Thou. $	$1.82	$/Gallon
Alternative	Biodiesel	479.4	8,340.5	0.0	8,819.9	Thousand Gallons	1,212,734.3	MMBtu	$21,526.0	Thou. $	$2.44	$/Gallon
Alternative	E-85	0.0	0.0	0.0	0.0	Thousand Gallons	0.0	MMBtu	$0.0	Thou. $		$/Gallon
Alternative	CNG	0.0	0.0	0.0	0.0	Billion BTUs	0.0	MMBtu	$0.0	Thou. $		$/MMBtu
Alternative	[Enter Name]	0.0	0.0	0.0	0.0	Billion BTUs	0.0	MMBtu	$0.0	Thou. $		$/MMBtu
Alternative	[Enter Name]	0.0	0.0	0.0	0.0	Billion BTUs	0.0	MMBtu	$0.0	Thou. $		$/MMBtu
Alternative	[Enter Name]	0.0	0.0	0.0	0.0	Billion BTUs	0.0	MMBtu	$0.0	Thou. $		$/MMBtu

- Conversions to Btu, calculation of CO_2, CH_4, N_2O emissions, conversion to CO_2e using GWP (to the right of this excerpt)
- GHG Target Excluded Vehicles and Equipment
  - Combat support, combat service support, tactical or relief operations, or training
  - Federal law enforcement
  - Emergency response
  - Spaceflight vehicles

Scope 2 Indirect Emissions: Purchased Steam and Hot Water

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Energy Type	Category	Fuel / Material	Annual Consumption GHG Target Subject	Annual Consumption GHG Target Excluded	Annual Consumption International *(Not Included under Target Subject)*	Total Annual Consumption	Unit of Measure	Cost	Unit of Measure	Unit Cost	Unit of Measure
Purchased Steam	Goal Subject	Natural Gas	10,631	-	-	10,631	Billion BTUs	276,868	Thou. $	26.04	$/MMBtu
Purchased Steam	Goal Subject	MSW Waste-To-Energy	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Steam	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Steam	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Steam	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Steam	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Steam	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Steam	Goal Subject	[Enter Custom Plant Fuel(s)]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Steam	Goal Subject	CEMS	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	Natural Gas	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	[Select Plant Fuel]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	[Enter Custom Plant Fuel(s)]	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Purchased Hot Water	Goal Subject	CEMS	-	-	-	-	Billion BTUs	-	Thou. $		$/MMBtu
Sub-Totals	Goal Subject		10,631	-	-	10,631	Billion BTUs	276,868	Thou. $	26.04	$/MMBtu

- Separate Table for EISA Energy Goal Excluded Facilities (below this excerpt)
- Conversions to Btu, calculation of CO_2, CH_4, N_2O emissions, conversion to CO2e using GWP (to the right of this excerpt)

Scope 2 Indirect Emissions: Purchased Chilled Water

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Scope 2 Indirect Emissions: Purchased Chilled Water (Includes Transmission and Distribution Losses)

Section 9, Technical Support Document, Appendix B, Section 3

FEMP EISA 2007 Goal Subject Buildings Purchased Chilled Water: Default Methodology (Electric-Driven Chiller)

Energy Type	Category	Chiller Type	eGRID Subregion	Annual Consumption GHG Target Subject	Annual Consumption GHG Target Excluded	Annual Consumption International *(Not Included under Target Subject)*	Total Annual Consumption	Unit of Measure	Cost	Unit of Measure	Unit Cost	Unit of Measure
Purchased Chilled Water	Goal Subject	Electric-Driven	U.S. National Average	1731.6	0.0	0.0	1731.6	Billion BTUs	27,234.50	Thou. $	15.73	$/MMBtu
Purchased Chilled Water	Goal Subject	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu
Purchased Chilled Water	Goal Subject	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu
Purchased Chilled Water	Goal Subject	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu
Purchased Chilled Water	Goal Subject	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu

FEMP EISA 2007 Goal Excluded Buildings Purchased Chilled Water: Default Methodology (Electric-Driven Chiller)

Energy Type	Category	Chiller Type	eGRID Subregion	Annual Consumption GHG Target Subject	Annual Consumption GHG Target Excluded	Annual Consumption International *(Not Included under Target Subject)*	Total Annual Consumption	Unit of Measure	Cost	Unit of Measure	Unit Cost	Unit of Measure
Purchased Chilled Water	Excluded	Electric-Driven	U.S. National Average	109.9	0.0	0.0	109.9	Billion BTUs	2,500.29	Thou. $	22.76	$/MMBtu
Purchased Chilled Water	Excluded	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu
Purchased Chilled Water	Excluded	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu
Purchased Chilled Water	Excluded	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu
Purchased Chilled Water	Excluded	Electric-Driven	[Select eGRID Subregion]	0.0	0.0	0.0	0.0	Billion BTUs	0.00	Thou. $		$/MMBtu

- Alternative Advanced Methodologies for non-electric chillers (absorption/engine-driven) and custom (below this excerpt)
- Conversions to Btu, calculation of CO_2, CH_4, N_2O emissions, conversion to CO2e using GWP (to the right of this excerpt)

Scope 1: Fugitive Emissions
Direct Emissions

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Scope 1 Fugitive Emissions: Fugitive Fluorinated Gases and Other Fugitive Emissions ***(Not to Include Process Emissions)***

Section 9, Technical Support Document, Appendix A, Section 5

Fugitive Emissions Default Methodology

Data Type Entered		[Enter Data Type]		[Enter Data Type]								
		Step 1				Step 2						
Material Type:	Composition	Target Subject Quantity Purchased / Issued	Target Excluded Quantity Purchased / Issued	International Quantity Purchased / Issued *(Not Included under Target Subject)*	Unit of Measure	Target Subject Quantity Returned to Supply	Target Excluded Quantity Returned to Supply	International Quantity Returned to Supply *(Not Included under Target Subject)*	Unit of Measure	Mixed Refrigerants Contribution *(see Tab 1)*	Unit of Measure	Total Quantity Emitted by Type
HFC-43-10mee	CF3CHFCHFCF2CF3	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
Perfluorocarbons (PFCs)												
PFC-14	CF4	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs	0.0	lbs	0.0
PFC-116	C2F6 (CF3CF3)	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs	0.0	lbs	0.0
PFC-218	C3F8 (CF3CF2CF3)	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs	0.0	lbs	0.0
PFC-318 or PFC-c318	c-C4F8 (-(CF2)4-)	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs	0.0	lbs	0.0
PFC-3-1-10	C4F10	3.0	2.0	0.0	lbs	2.0	1.0	0.0	lbs		lbs	2.0
PFC-4-1-12	C5F12	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
PFC-5-1-14	C6F14	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
PFC-9-1-18	C10F18	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
Perfluorocyclopropane	c-C3F6	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
Sulfur hexafluoride	SF6	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
Other fugitive gases												
[Enter Fugitive Gas Name]	[Enter Molecular Cor	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
[Enter Fugitive Gas Name]	[Enter Molecular Cor	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0
[Enter Fugitive Gas Name]	[Enter Molecular Cor	0.0	0.0	0.0	lbs	0.0	0.0	0.0	lbs		lbs	0.0

Total CO2e	6.4	MT CO2e

Source: *U.S. EPA Climate Leaders Program, Technical Guidance, Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment, May 2008, see: http://www.epa.gov/stateply/documents*

3.5 SCOPE 1 Mixed Refrigerants | **3.6 SCOPE 1 Fugitive F-gases** | 3.7 SCOPE 1 Fugitive Wastewater | 3.8 SCOPE 1 Fugitive Landfill | 3.9 SCOPE 1 Process | 3.10 SCOPE_2

Ready 100%

Scope 1: Fugitive Emissions Wastewater Treatment Plants (WWTP)

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Scope 1 Fugitive Emissions: On-site Wastewater Treatment ***(GHG Target Subject Domestic Only)***

Section 9, Technical Support Document, Appendix A, Section 6

Step 1			
Waste Water Treatment Process Type	**Agency has:**	**Total Population Served**	**Units**
On-Site Centralized WWTP with Anaerobic Digestion	[Yes/No]		Persons
On-Site Centralized WWTP with Nitrification / Denitrification	[Yes/No]		Persons
On-Site Centralized WWTP without Nitrification / Denitrification	[Yes/No]		Persons
On-Site Effluent Discharge to Rivers and Estuaries with Nitrification / Denitrification	[Yes/No]		Persons
On-Site Effluent Discharge to Rivers and Estuaries without Nitrification / Denitrification	[Yes/No]		Persons
On-Site Wastewater Treatment Lagoons	[Yes/No]		Persons
On-Site Septic Systems	[Yes/No]		Persons

* WWTP = Wastewater treatment plant

Process Type	GHG Type	Composition	Total Population Served by the WWTP	Workdays per Year	Fraction Allocated to Facility	Per Capita Digester Gas Produced per Day	Unit of Measure	Fraction CH4 in Biogas	Density of CH4 (Standard Conditions)	Unit of Measure	Total Quar Emitted I Type
On-Site Centralized WWTP with Anaerobic Digestion	Carbon dioxide (biogenic)	CO2									
	Methane	CH4	0.0	230.00	0.5	1.0	CUFT / Person / Day	65.0%	0.019	kg / CUFT	
	Nitrous oxide	N2O									

Process Type	GHG Type	Composition	Total Population Served by WWTP with N/D	Workdays per Year	Fraction Allocated to Facility	N2O Emission Factor for a WWTP	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure	Unit Conversion	Unit of Measur
On-Site Centralized WWTP with Nitrification / Denitrification	Nitrous oxide	N2O	0.0	230.00	0.5	0.019	g / Person / Day	0.0	g	0.000001	MT / g

3.5 SCOPE 1 Mixed Refrigerants | 3.6 SCOPE 1 Fugitive F-gases | **3.7 SCOPE 1 Fugitive Wastewater** | 3.8 SCOPE 1 Fugitive Landfill | 3.9 SCOPE 1 Process | 3.10 SCOPE_2

Ready 100%

Scope 1: Fugitive Emissions
Landfill Emissions

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Scope 1 Fugitive Emissions: On-site Landfills and Municipal Solid Waste Facilities ***(GHG Target Subject Domestic Only)***

Section 9, Technical Support Document, Appendix A, Section 7

Process Type	GHG Type	Composition	Total Quantity	Unit of Measure
Landfill Gas Production	Mass of Solid Waste Disposed On-site		0.0	Short Tons
	Landfill Open Date		[Enter Date]	Year
	Landfill Close Date		[Enter Date]	Year

Process Type	GHG Type	Composition	Total Quantity Emitted by Type	Unit of Measure	Percentage Uncontrolled Release	Landfill Gas Collection System Efficiency	Venting Loss	Total Quantity	Unit of Measure	Methotropic Bacteria Oxidation Factor	HHV	Unit of Measure
Landfill Gas Production	Carbon dioxide (biogenic)	CO2	0.0	MT (Megagram)	100%			0.0	MT			
	Methane	CH4	0.0	MT (Megagram)	50%			0.0	MT	10%		
Methotropic Oxidation	Carbon dioxide (biogenic)	CO2								10%		
Landfill Gas Collection Loss	Methane	CH4				75%		0.0	MT	10%		
Methotropic Oxidation	Carbon dioxide (biogenic)	CO2								10%		
Landfill Gas Flaring	Carbon dioxide (biogenic)	CO2									43.8	MMBtu/MT CH4
	Methane	CH4				75%	1%	0.0	MT		43.8	MMBtu/MT CH4
	Nitrous oxide	N2O									43.8	MMBtu/MT CH4
Landfill Gas Flare Venting	Methane	CH4						0.0	MT			

Total CO2e	0.0	MT CO2e
Total CO2 (biogenic)	0.0	MT CO2

Source 1: *U.S. EPA Technology Transfer Network, Clean Air Technology Center, Landfill Gas Emissions Model (LandGEM), see at: http://www.epa.gov/ttn/chief/efpac/esttools.html*

3.5 SCOPE 1 Mixed Refrigerants | 3.6 SCOPE 1 Fugitive F-gases | 3.7 SCOPE 1 Fugitive Wastewater | **3.8 SCOPE 1 Fugitive Landfill** | 3.9 SCOPE 1 Process | 3.10 SCOPE_2

Ready 100%

Scope 3 Reporting Modules

- Transmission and Distribution Losses
- Federal Employee Business Air Travel
- Federal Employee Business Ground Travel: Rail, Rentals, Buses
- Federal Employee Commuting
- Contracted Municipal Solid Waste Disposal
- Contracted Wastewater Treatment

GHG Emissions Results Summary

(reflects Version 1.2 updates)

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Scope and Category	Total Quantity Emitted GHG Target Subject (MT CO2e)	Total Quantity Emitted GHG Target Excluded (MT CO2e)	Total Quantity Emitted International (MT CO2e)	Total Quantity Emitted (MT CO2e)	Total Quantity Emitted Biogenic CO2 (MT)
Scope 1: Stationary Combustion: EISA 2007 Goal Subject and Excluded Building Energy Consumption	10,684,229.0	0.0	0.0	10,684,229.0	0.0
Scope 1 Mobile Emissions: Vehicles and Equipment	967,116.6	47,874,787.1	0.0	48,841,903.6	4,477.4
Scope 1 Mobile Emissions: FAST	3,423,224.5	0.0	0.0	3,423,224.5	70,799.9
Scope 1 Fugitive Emissions: Fugitive Fluorinated Gases and Other Fugitive Emissions	0.0	0.0	0.0	0.0	
Scope 1 Fugitive Emissions: On-site Wastewater Treatment***	0.0			0.0	0.0
Scope 1 Fugitive Emissions: On-site Landfills and Municipal Solid Waste Facilities***	0.0			0.0	0.0
Scope 1: Industrial Process Emissions By Process	0.0	0.0	0.0	0.0	
Subtotal Scope 1	**15,074,570.1**	**47,874,787.1**	**0.0**	**62,949,357.1**	**75,277.3**
Scope 2: Purchased Electricity Consumption	32,346,575.4	0.0		32,346,575.4	0.0
Scope 2: Purchased Renewable Energy Biomass Emissions	0.0	0.0		0.0	0.0
Scope 2 Indirect Emissions: Purchased Steam and Hot Water (Includes Transmission and Distribution Losses)	1,125,123.2	0.0	0.0	1,125,123.191	0.0
Scope 2 Indirect Emissions: Purchased Chilled Water (Includes Transmission and Distribution Losses)	86,517.0	0.0	0.0	86,517.0	
Scope 2: Indirect Emissions: Purchased CHP Electricity, Steam & Hot Water	0.0	0.0	0.0	0.0	
Subtotal Scope 2	**33,558,215.5**	**0.0**	**0.0**	**33,558,215.5**	**0.0**
Scope 2: Reductions from Renewable Energy Use	0.0	0.0		0.0	
Subtotal Scope 1 & 2	**48,632,785.6**	**47,874,787.1**	**0.0**	**96,507,572.6**	**75,277.3**
Scope 3: Transmission and Distribution (T&D) Losses*	2,130,695.3	0.0		2,130,695.3	0.0
Scope 3: Biomass Electricity Generated with No RECs				0.0	0.0
Scope 3: Federal Employee Business Air Travel**	0.0			0.0	
Scope 3: Federal Employee Business Ground Travel***	0.0			0.0	
Scope 3: Federal Employee Commuting***	0.0			0.0	
Scope 3: Contracted Wastewater Treatment***	0.0			0.0	0.0
Scope 3: Contracted Municipal Solid Waste Disposal***	0.0			0.0	0.0
Subtotal Scope 3	**2,130,695.3**	**0.0**	**0.0**	**2,130,695.3**	**0.0**
Scope 3: Renewable Energy Generated with No RECs				0.0	
Total	**50,763,480.9**	**47,874,787.1**	**0.0**	**98,638,268.0**	**75,277.3**

FedCenter GHG Inventory Support

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Greenhouse Gas Inventory Reporting

Greenhouse gas (GHG) Inventory Reporting is the final EO 13514 reporting target due to CEQ and OMB on 31 January 2011. In this section you will find a variety of plans, templates and tools to help you create a comprehensive GHG inventory.

FEMP and CEQ Reporting Resources

Look here first to access the five core documents of Federal agency greenhouse gas (GHG) reporting under section 9 of Executive Order 13514.

Checklist

Here you will find a step-by-step introduction to the essentials of greenhouse gas (GHG) accounting for your agency. It details the roles of three types of participants: Senior Sustainability Officer, GHG Lead, and GHG Data Collector.

Inventory Management Plan (IMP)

Customize this template of an Inventory Management Plan to detail the methods to be used by your agency. Quickly define roles and responsibilities (with specific POCs), data management approach, data elements, training, archiving, updating, and verification.

Data Requirements

Customize this generic GHG inventory data requirement document to provide the details needed by those who collect the data for your agency.

FAQs

Review these key Frequently Asked Questions to take some of the mystery out of your GHG inventory job. These are up-to-date answers from the Federal Energy Management Program (FEMP).

GHG Inventory Menu

- Greenhouse Gases Home
- FEMP/CEQ Resources
- Checklist
- Inventory Mgmt Plan
- GHG Data Requirements
- FAQs
- GHG Inventory Tools
- Commuter Survey
- Training
- Best Practices
- White Papers and Demos

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Greenhouse Gas News

Oct 4, 2010

Federal Green Challenge Web Academy: Public Sector Protocols for GHG Emissions Inventories (Live Webinar) (10/07/2010)

Sep 9, 2010

White House Announces Release of Federal Agency Strategic Sustainability Performance Plans (SSPP)

Aug 17, 2010

Comment Period Extended for Draft Guidance, "Federal Greenhouse Gas Accounting and Reporting"

Aug 4, 2010

GreenGov Symposium Now Open for Registration

Jul 26, 2010

ACCO Climate Change Leadership Summit & Gala (Classroom) (11/08/2010)

Managing Waste: A Workshop on Addressing Perception, Establishing Metrics and Developing Systems and Partnerships

Done Now: Partly Sunny, 53° F Wed: 64° F Thu: 74° F

FEMP Technical Assistance

FEMP is continuing to provide agencies limited support through its one-to-one technical assistance program.

- FEMP technical support representatives can provide **general review and guidance** for inventory planning, identification of data and emissions sources, calculations, and other agency-specific efforts.

- The level of support available is limited; agencies are ultimately responsible for developing their complete GHG inventories.

FEMP Technical Assistance POCS:

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